

NEW TRICHOPTERA

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Recent examination of caddis fly collections from various parts of North America has revealed several new and interesting species. Six of these new species have been selected for descriptions in this paper. Five of these species, one *Chimarra*, two *Limnephilus* and two *Lepidostoma* represent additions to the already large number of Trichoptera known to occur in western North America. Types are either in the collection of the writer or the California Academy of Sciences.

Grateful acknowledgment is made to Dr. Oliver S. Flint, Smithsonian Institution, U. S. National Museum, who furnished me with a seventh species, *Lepidostoma bispinosa* (Ulmer), so that it could be compared to a closely related species described herein.

Genus CHIMARRA Stephens

The genus *Chimarra* is abundant and widespread with a large number of species known from the tropical and subtropical regions of the world. Twenty-five species are now known to occur in Mexico, the West Indies, and the United States. The number of North American species will increase as more collections become available from Mexico and Latin America.

***Chimarra butleri* Denning, new species**

Although a member of the *aterrima* group, *C. butleri* bears very little resemblance to other described species. Distinguishing characters are confined to the clasper, the tenth tergite and the ninth tergum of the male genitalia.

Male.—Length 6-8 mm. Head, body, antenna and appendages uniformly dark brown. Wings dark, pubescence of head and thorax brownish. Palpi dark brown, second segment bearing a tuft of long black setae. Spurs 1-4-4. Genitalia as in fig. 1. Ninth segment with ventral portion slightly wider than remainder, mesal triangular projection not pronounced; dorsal portion narrow, projecting caudad beyond remainder of segment, widely separated on dorsum (fig. 1C). Clasper with base narrow; from lateral aspect, fig. 1A, ventral margin broadly arcuate, apex sub-triangular, dorsal portion truncate; viewed from caudo-ventral aspect fig. 1B, ventral margin dentate, heavily sclerotized. Tenth tergite, lateral aspect, somewhat quadrangular, lightly sclerotized, rounded and narrowed apically; viewed dorsally, fig. 1C, dorsum membranous, lateral lobes narrow, terminating in an acute apex. Aedeagus tubular, a pair of dark sclerotized slender rods present in main body which project beyond tenth tergite plates.

Female.—Length 7 mm. Color and general structure very similar to male. As is characteristic in the genus, genitalic characters are apparently not

sufficient to distinguish this species from other described species.

It is with pleasure that this *Chimarra* is named in honor of Dr. G. D. Butler, University of Arizona Entomologist who collected this interesting species.

Holotype male, KINGS CANYON NATIONAL PARK, CALIFORNIA, SHEEP CREEK CAMPGROUND, June 18, 1953, G. D. Butler. Allotype female, same data as for holotype. Paratypes males and females (14♂♂, 2♀♀), same data as for holotype. The holotype and allotype are in the collection of the California Academy of Sciences, San Francisco, California.

Genus LIMNEPHILUS Leach

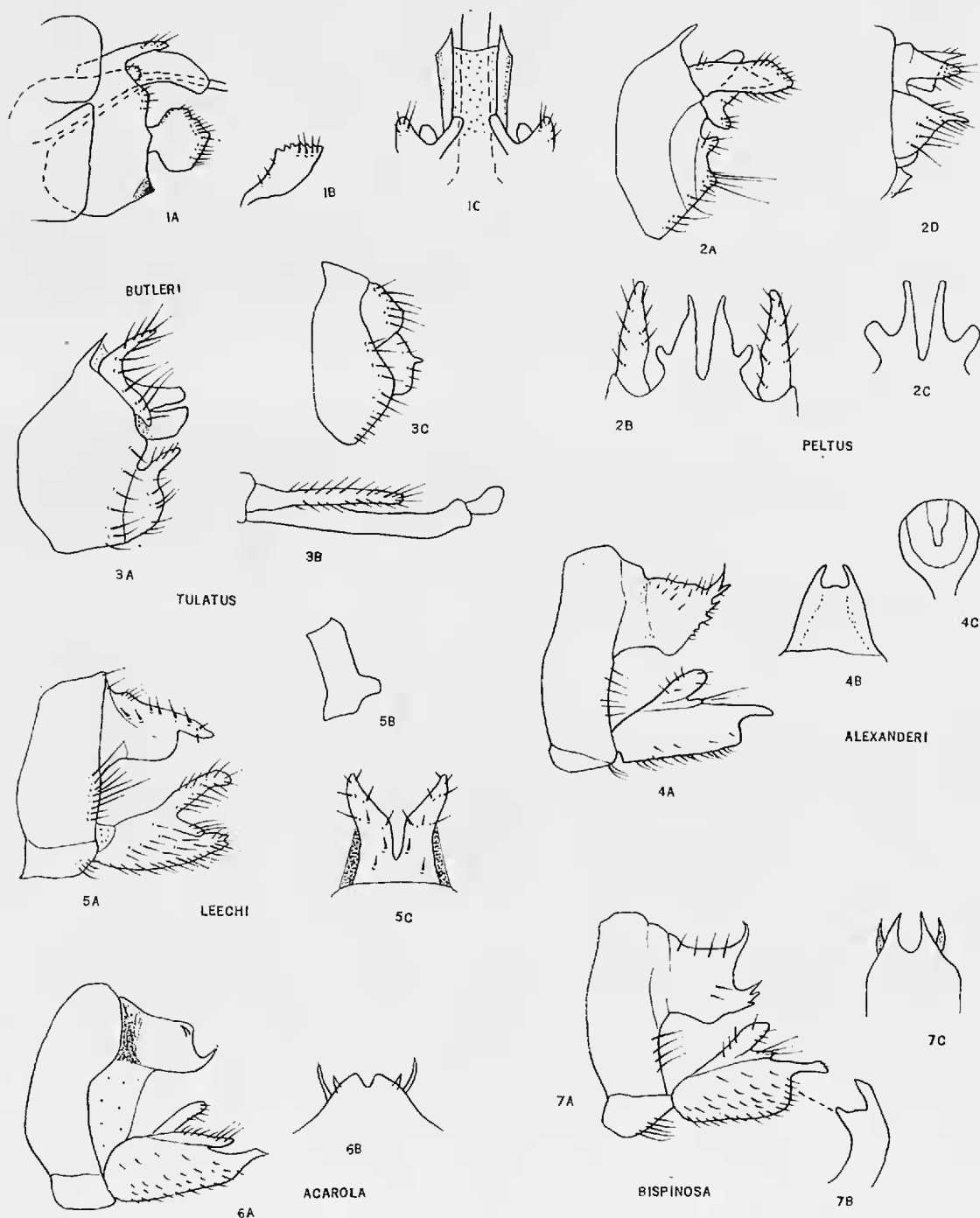
Schmid and other workers have proposed the division of *Limnephilus* into: *Anabolia*, *Asynarchus*, *Lenarchus* and *Lenarchulus*. At present, this has not received wide acceptance among the North American workers. Regardless of the future placement of well over 100 species now ascribed to *Limnephilus*, the two species described here are typical members of that genus.

Limnephilus peltus Denning, new species

This species belong to the *moestus* group, as shown by the long blade-like clasper and tenth tergite. Within this group, which now consists of seven western species, it bears closest resemblance to *moestus* Banks. The narrower cercus and the basal projection of the tenth tergite will quickly differentiate *peltus* from *moestus* and other related species.

Male.—Length 13-15 mm. Color of head, body and appendage yellowish. Fore wings yellowish with irregular dark markings at stigma and near apex. Front basitarsus almost one and one-half times length of second segment. Eighth tergite simple, similar to seventh. Genitalia as in fig. 2. Ninth segment produced dorsad into a high, very narrow bridge; lateral portion merges imperceptibly with clasper. Clasper short, incised distally to form a dorsal digitate-like lobe and a ventral lobe bearing 4-5 long setae. Cercus narrow and long, longer than tenth tergite; mesal surface heavily sclerotized, slightly concave. Tenth tergite lobes massive; a prominent apically circular, protuberance arises from near base which is barely visible from lateral aspect but plainly discernible from dorsal aspect (fig. 2B), or ventral aspect (fig. 2C); viewed laterally, fig. 2A, attenuated distally to an acute apex; distal margin dark, heavily sclerotized. Aedeagus with lateral arm narrowed distally, apical portion angled sharply dorsad.

Female.—Length 12-14 mm. General color and structure similar to male. Genitalia (fig. 2D) with cercus long and narrow; tubular tenth tergite narrowly excised, dorsum projecting caudad beyond remainder. Ninth sternum with long narrow digitate protuberance projecting directly caudad beyond remainder.



EXPLANATION OF FIGURES

Fig. 1, *Chimarra butleri*, male genitalia; 1A, lateral aspect; 1B, clasper, caudo-ventral aspect; 1C, tenth tergite, dorsal aspect. Fig. 2, *Limnephilus peltus*, male genitalia; 2A, lateral aspect; 2B, tenth tergite, dorsal aspect; 2C, tenth tergite, ventral aspect; 2D, female genitalia, lateral aspect. Fig. 3, *Lemnephilus tulatus*, male genitalia; Fig. 3A, lateral aspect; 3B, aedeagus, lateral aspect; 3C, female genitalia, lateral aspect. Fig. 4, *Lepidostoma alexanderi*, male genitalia; Fig. 4A, lateral aspect; 4B, tenth tergite, dorsal aspect; 4C, female genitalia, spermatheca and subpenital plate. Fig. 5, *Lepidostoma leechi*, male genitalia; 5A, lateral aspect; 5B, first antennal segment; 5C, tenth tergite, dorsal aspect. Fig. 6, *Lepidostoma acarola*, male genitalia; 6A, lateral aspect, 6B, tenth tergite, dorsal aspect. Fig. 7, *Lepidostoma bispinosa*, male genitalia; 7A, lateral aspect; 7B, clasper ventral aspect; 7C, tenth tergite, dorsal aspect.

Holotype male, SEQUOIA NATIONAL PARK, CALIFORNIA, June 15, 1953, G. D. Butler. Allotype female, same data as for holotype. Paratypes (9♂♂, 4♀♀) same data as the holotype; one male, Lassen National Park, California, July 27, 1959, C. P. Alexander. Holotype and allotype deposited in the collection of the California Academy of Sciences, San Francisco, California.

***Limnephilus tulatus* Denning, new species**

This species is closely related to *lithus* (Milne), a species which has had no other known close relative. *L. lithus* is known to occur in South Dakota, Texas and the Rocky Mountain area of Colorado, at the present time *L. tulatus* is known to occur in the arid southern portion of Arizona. The narrow cercus, quadrangular tenth tergite and the slender finger-like process of the clasper will readily separate this species from *lithus*.

Male.—Length 17 mm. Color of head, body and appendages rufus, wings brownish and darkly irrorate. Front legs with basitarsus about one-third length of second tarsal segment, the mesal surface of femur bearing a linear row of black spinules opposing the tibia. Eighth tergite with an apico-mesal cushion of minute spines. Genitalia as in fig. 3. Ninth segment robust, produced dorsad into a narrow bridge, ventral margin wide, merging imperceptibly with clasper. Clasper with dorsal margin projected dorso-caudad as a long slender digitate apex. Cercus with distal margin deeply emarginate, the structure thus becoming very narrow and elongate when viewed laterally (fig. 3A) from caudal aspect mesal surface deeply concave, the meso-basal portion produced caudad into a heavily sclerotized process closely appressed to the tenth tergite lobe. Tenth tergite from lateral aspect (fig. 3A) consists of a flattened quadrangular lobe. Aedeagus (fig. 3B) apically blunt, lateral arm sclerotized and of similar width throughout.

Female.—Length 18 mm. Color and general structure similar to male. Ninth segment narrowed dorsally, ventral area broad. Cerci large, subtriangular, fused on meson. Tenth segment with dorsum projected caudad as a dark sclerotized acute process (fig. 3C).

Holotype male, SYCAMORE CREEK, NEAR RUBY, SANTA CRUZ COUNTY, ARIZONA, November 19, 1955, W. Nutting and F. Werner. Allotype female, Tucson, Arizona, April 5, 1917, C. T. Vorhies. Paratypes two males, same data as for allotype. Holotype and allotype deposited in the collection of the California Academy of Sciences, San Francisco, California.

Genus LEPIDOSTOMA Rambur

The genus is characterized by pronounced sexual dimorphism, some members of the genus displaying the most bizarre characters known in the Trichoptera. The following three new species will bring to 50 the known North American *Lepidostoma*. Slightly over

half the described species are known from western North America. Characteristically, many of these species appear to be local in distribution.

***Lepidostoma alexanderi* Denning, new species**

This species is a member of the unicolor group of *Lepidostoma*, the predominant group in the genus. It may readily be distinguished from other described *Lepidostoma* by the serrate margin of the tenth tergite.

Male.—Length 8-9mm. Wings, legs, antennae rufus. Front and hind wings with no modifications. Maxillary palpus flattened, triangular, mesal surface concave and bearing whitish scales. Antennal first segment with mesal surface excavated, bearing dense flattened setae and several tufts of long slender black-tipped scales, otherwise no secondary modifications. Genitalia as in fig. 4. Tenth tergite seen from dorsal aspect, fig. 4B, widely separated on meson; apices attenuated and curved slightly mesad but not confluent. Viewed laterally (fig. 4A), distal margin of tenth tergite serrate, usually with 3 to 4 well-developed teeth and terminating in a long slender dorsad-curved spine. Clasper rather short, projecting slightly beyond tenth tergite, it is distinctive in that the apico-dorsal corner is developed into a digitate lobe; baso-dorsal process short and thick. Aedeagus bearing a pair of acuminate rods, closely appressed to dorsal surface of structure.

Female.—Length 8 mm. Genitalia as in fig. 4C. Color, size, general appearance similar to male. First antennal segment about twice length of head. No secondary modifications. Spermatheca and subgenital plate as in fig. 4C.

Holotype male, SOUTHWESTERN RESEARCH STATION, CHIRICAHUA MOUNTAINS, COCHISE COUNTY, ARIZONA, August 7-12, 1957, C. P. Alexander. Allotype female, same data as for holotype. Paratypes (4♂♂, 19♀♀) same data as the holotype. The Southwestern Research Station of the American Museum of Natural History is near Portal, Arizona.

This new *Lepidostoma* is named in honor of Dr. C. P. Alexander, foremost authority of Tipulidae in the world, who collected this and many other interesting specimens of Trichoptera in North America.

***Lepidostoma leechi* Denning, new species**

Only a few *Lepidostoma* are presently known from Mexico. *L. leechi* belongs to the *unicolor* group with distinguishing characters confined to the tenth tergite and the first antennal segment.

Male.—Length 11 mm. Wings, legs, antennae brownish, body black. Maxillary palpus one segmented, elliptical and bearing dark setae; mesal surface concave, only the lower margin bearing a dense group of scale-like setae. First antennal segment greatly elongated, mesal margin bearing a short, thick process (fig. 5B). Spurs 2-4-4. Wing margin not reflexed and with no secondary modifications. Genitalia as in fig. 5. Tenth tergite, from lateral aspect,

with dorso-caudal margin projecting ventro-caudad as a prominent, distinct digitate process; ventral margin broadly arcuate; dorsal portion of structure clothed with sparse, short, spine-like setae. Tenth tergite, from dorsal aspect (fig. 5C), with lateral lobes separated and gradually divergent, nearly acute apically, setae short and sparse. Claspers short and stocky, terminating in a short bifid apex heavily clothed with setae; baso-lateral lobe very long, slender, the lateral lobe short and closely appressed to main body; heavily covered with long setae. Aedeagus arcuate, dorsal rods short, closely appressed to structure.

Holotype male, ONE MILE WEST OF LA MARQUESA, MEXICO, APPROXIMATELY 9200 FEET ELEVATION (34 KILOMETERS WEST OF MEXICO, D.F.), December 8, 1948, H. B. Leech. Type deposited in the collection of the California Academy of Sciences, San Francisco, California.

This species is named in honor of Hugh B. Leech, California Academy of Sciences, San Francisco, California, collector of this and many other interesting caddisflies.

Lepidostoma acarola Denning, new species

This species is a member of the unicolor group with distinguishing characters confined to the tenth tergite and other structures of the distinctive male genitalia. This distinctive species does not appear to be closely related to any known species.

Male.—Length 9 mm. Body, antennae and appendages light brown. Wings uniformly light brown except for a short black line at base of R. Maxillary palpus one segmented, somewhat spatulate, bearing a dense brush of brownish setae. First antennal segment very long but not modified. Wings not reflexed and with no secondary modifications. Spurs 2-4-4. Genitalia as in fig. 6. Tenth tergite, lateral aspect (fig. 6A), separated from ninth tergum by a distinct furrow; ventral corner broadly rounded dorsad to form a prominent curved spur, near dorsal corner a short dorsad-directed spur is barely discernible. When viewed from dorsal aspect, dorsal lobes of tenth tergite (fig. 6B) slightly emarginate, the short dorsal and long ventral spurs distinctly visible. Claspers short, apex constricted distally to a truncate apex; baso-dorsal lobe with lateral lobe long and slender, appressed to dorsal margin of clasper and tapering gradually to an acute apex; dorsal lobe short and slender. A very lightly sclerotized sheath extends from the tenth tergite to the base of the claspers. Aedeagus bearing a pair of heavy flat rods, approximate most of distance, apical portion acuminate and projecting slightly beyond apex of structure.

Female.—Length 9-11 mm. Color and general structure identical to male. First antennal segment very long and slender, about twice the length of the head, setation rather sparse. Seventh sternite unmodified except that the apical margin is slightly emarginate. Eighth tergite unmodified, bearing one row of long yellowish setae along the apical margin on each side of the meson; sternite a wide somewhat quadrate sclerotized area. Ninth tergite

consists of a typical short fleshy lobe. To date diagnostic characters are largely lacking for the females in this group.

Holotype male, COCHISE COUNTY, ARIZONA, SOUTHWESTERN RESEARCH STATION, FIVE MILES NORTHWEST OF PORTAL, August 25, 1960, D. C. Rentz. Allotype female, same data as for holotype. Paratypes (1♂, 1♀) same data as the holotype. Holotype and allotype deposited in the collection of the Academy of Sciences, San Francisco, California.

LEPIDOSTOMA BISPINOSA (Ulmer)

This species is a member of the unicolor group of *Lepidostoma*. It is readily distinguished from other described species by the spines of the distal margin of the tenth tergite and the clasper. Especially in the shape of the claspers, *L. alexanderi* Denning bears closest resemblance to *bispinosa* (Ulmer).

Male—Length 10 mm. Wings, legs, antennae light brown. Front and hind wings with no modifications. Maxillary palpus flattened, triangular, pubescence fairly heavy. First antennal segment long but with no modifications.

Genitalia as in fig. 7. Tenth tergite, dorsal aspect (fig. 7C) with dorsal and vertical spine plainly discernible as an acute apex, mesal lobes widely separated. Tenth tergite viewed laterally, (fig. 7A) with distal margin developed into a prominent dorsal spine, curved slightly cephalad, and a strong basal spine consisting of three components. Clasper short, extending slightly beyond tenth tergite, dorsal lobe directed posteriorad as a slender digitate process; baso-dorsal process with dorsal lobe short and thick and the lateral lobe slender, truncate and closely appressed to main body; seen from ventral aspect, (fig. 7B), the meso-apical corner projects mesad as a short sub-acute lobe. Aedeagus arcuate possessing a dorsal pair of acuminate rods closely appressed to main structure.

Described from a male collected at Cayuga, Guatemala, Schaus and Barnes. The specimen was identified by Dr. Oliver S. Flint, Smithsonian Institution, U. S. National Museum, who kindly loaned it to the writer for inclusion in this paper.

BOOK NOTICES

A MONOGRAPH OF THE IMMATURE STAGES OF NEOTROPICAL TIMBER BEETLES (Cerambycidae). By E. A. J. Duffy. London: British Museum (Natural History). [7+] 327 pp., frontispiece, 176 figs. in text, XIII pls. September, 1960. Price six pounds six shillings.

This is the third volume in a regional treatment of the immature stages of the Cerambycidae of the world. The text figures, most by Mr. Duffy, are clear and to the point; the plates illustrate chiefly larval work and pupal cells. The identification keys are grouped on pp. 12-41, and preceded by figures and explanations which enable the beginner to use them. This does

not mean that they are easy to use, for the subject is inherently difficult. There are many detailed descriptions, original or from the literature; in other cases what is known of the distribution, host plants, biology, parasites, economic importance and references is reported.

MITES OR THE ACARI. By T. E. Hughes. London: The Athlone Press, University of London. viii + 225 pp., including "plates" I-LII. June 18, 1959. \$6.75. (Available from Essential Books, 16-00 Pollitt Dr., Fair Lawn, N.J.).

A nicely produced book; unfortunately neither the nomenclature nor the digest of literature appear to be up to date.—HUGH B. LEECH, *California Academy of Sciences, San Francisco.*

BOOK REVIEW

CATALOGUS COLEOPTERORUM FENNOSCANDIAE ET DANIAE.

Auctoribus: V. Hansen, E. Klefbeck, O. Sjöberg, G. Stenius et A. Strand. Redigenda curavit: C. H. Lindroth. 476 pp. and 1 map. Entomologiska Sällskapet, Lund. 1960. (Available from the Entomological Society, Zoological Institute, Lund, Sweden; price: 50 Swedish Crowns.)

Students of Coleoptera, and especially of the geographical distribution of beetles, will appreciate this excellent geographical catalogue. The classification adopted is that of Winkler and the species are listed in tables extending over four pages capable of showing their presence or absence in 37 provinces in Norway, 31 in eastern Fennoscandia, 30 in Sweden and 3 in Denmark, as well as their presence or absence in northern Germany and the British Isles. For convenient reference the provinces are superimposed in red on a general map of the region. Thus the extra-territorial user can quickly determine the known distributional range in Scandinavia of any species in which he is interested and the local collector, because of the simple system used, can add records to his own copy with a maximum of ease.

This catalogue, like its predecessor, the 129 page *Catalogus Coleopterorum Daniae et Fennoscandiae* published in 1939 by the Societas pro Fauna et Flora Fennica, Helsingfors, is an international cooperative venture. Two of the collaborators, the distinguished Danish Coleopterist Victor Hansen, author of the beetle sections of *Denmarks Fauna*, and his Norwegian counterpart Andreas Strand, author of many taxonomic revisions, participated actively in the preparation of both editions. Both are amateurs, as is Gunnar Stenius of Finland and the two Swedish authors Oscar Sjöberg and Einer Klefbeck. Unfortunately Sjöberg died before the work was completed.

The volume has been beautifully edited by Professor Carl H. Lindroth, Zoological Institute, University, Lund, Sweden and published by the Entomological Society, Lund. Because of the special type of printing required, the costs of publication were unusually high. However, financial support was provided by the Rask-Örsted Foundation (Denmark), the State Board of Natural Science (Finland), the Norwegian Board of General Science, and the Swedish Natural Science Research Council—a model of international cooperation!—E. GORTON LINSLEY, *University of California, Berkeley.*